Champagne & Aishihik First Nations

Upper Nordenskiold River Juvenile Chinook Salmon Investigations 2004

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Yukon River Panel - Restoration and Enhancement Fund

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Abstract

Field investigations for the presence of juvenile chinook salmon (JCS) (*Oncorhynchus tshawytscha*) were conducted on the Upper Nordenskiold River near Hutshi Lake in central Yukon on August 2 to August 5, 2004. Investigations were conducted on an unnamed tributary located one kilometre downstream of Hutshi Lake and and at two locations on the Nordenskiold River (one upstream and one downstream of the tributary). Gee-type minnow traps baited with Yukon River origin salmon roe were used to capture fish. A similar investigation was conducted in 2002 and 2003. No JCS were captured during 2004 at any of the sampling sites. JCS were captured in 2002 and 2003 with the majority of them captured in the unnamed tributary. Other species captured during the study included slimy sculpins, arctic grayling and long-nose suckers. Temperature loggers placed in the Nordenskiold River in 2003 were removed and replaced with new loggers. Temperature profiles for the period August 2003 – August 2004 are presented. Funding for the project was provided by the Yukon River Panel's Restoration and Enhancement (R&E) Fund.

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1 Acknowledgements

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- Champagne and Aishihik First Nations' Chief, council, and staff for identifying the need for this project and providing the necessary resources and support;
- Michael Jim & Linaya Workman, Renewable Resource Officers for CAFN, for providing input, advice, and direction throughout the projects development and completion;
- Lawrence Joe, Director of lands & resources for CAFN, for his continual support and arranging logistical support for the project.
- Al von Finster of Department of Fisheries and Oceans Canada , for providing technical support and direction
- David Petkovich is the author of this report; and conducted the field investigations with Linaya Workman and Aaron Workman
- Funding for this project has been provided by The Yukon River Panel's through the Restoration & Enhancement (R & E) Fund.

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4 Introduction

Background

In 1998/99 Champagne & Aishihik First Nations (CAFN) were successful in obtaining funding from the Yukon River Panel's Restoration and Enhancement Fund to complete the first stage of a restoration and enhancement (R&E) plan, and a salmon & salmon habitat inventory for the Nordenskiold River. Over the past five years the Yukon River Panel's Restoration & Enhancement (R&E) Program has been the primary funding agency for restoration activities on the CAFN Nordenskiold restoration projects however, in 1999/2000, the Department of Fisheries & Ocean's Habitat Restoration and Salmon Enhancement Program (HRSEP) also contributed funding. The 1998/99 inventory and its restoration recommendations acted as a data resource and guide for planning future restoration activities in the upper Nordenskiold River. The projects over the years have concentrated on:

- collecting juvenile chinook salmon (JCS) length and weight data;
- monitoring JSC utilization;
- obtaining stream temperature profiles through the placement of temperature data loggers;
- removing obstructions to salmon migration;
- collecting site specific salmon habitat and stream survey data;
- performing aerial spawning surveys; and
- collecting and cataloguing existing land use, biological, and traditional knowledge data for the area.

Yearly reports can be obtained from Yukon River Panel or the Champagne and Aishihik First Nations' offices.

This current study continued to investigate the prescence of JCS and monitor temperature profile in the system.

Study Area

The Nordenskiold River drainage basin lies within the Central Yukon Plateau Eco-region. The region is characterised by rolling hills and plateaus separated by broad, deeply cut valleys. The most common forest types are white and black spruce. Black spruce are dominant in colder, poorly drained areas. As naturally recurring fires are frequent, several vegetation communities are prevalent. Lodgepole pine and trembling aspen most commonly colonize burnt-over areas. Shrub birch and willow, with occasional paper birch and alpine fir, dominate the sub-alpine vegetation. Extensive grasslands occur on lower south-facing slopes. These grassland slopes form a significant vegetation feature in the Nordenskiold River Valley. The cold, semiarid climate of the region has a mean annual temperature of approximately -3.5^{0}C, with a summer mean of 12.0^{0}C and a winter mean of -19.0^{0}C.

The Nordenskiold River drains an area of approximately 6370 square kilometres. The headwaters of the Nordenskiold River are made up of Moraine Lake on the Kluane Plateau (elevation 910 meters) and Long Lake (elevation 1200 meters) both flowing north-east to a chain of three lakes known as Hutchi (Hutshi) Lakes (elevation 750 meters). The Nordenskiold River's (traditional - *Chu` ena Chù*) north-south trending out-wash valley flows from Hutchi Lakes (traditional - *Chu`ena Mä n)* to its confluence with the Yukon River at Carmacks (elevation 525 meters). The major tributaries of the Nordenskiold River include Long Lake Tributary, Moraine Lake Tributary (marked as *Nordenskiold* on maps), Klusha Creek, Kirkland Creek, and Rowlinson Creek.

The Nordenskiold River occurs within Champagne & Aishihik First Nations' (CAFN) traditional territory and contains partial overlaps with Little Salmon / Carmacks First Nation's (LSCFN) traditional territory. CAFN and LSCFN make up two of the 14 First Nation governments in the Yukon. Many CAFN members are descendents from or were past citizens of the historic Hutchi Village (traditional - Chu` ena Keyi) located on the southeast banks of the northern most Hutchi Lake. (Pumphrey, 2001)

Sampling for JCS was conducted in 2004 on the first five kilometres of the Nordenskiold River downstream of Hutchi Lake, including an unnamed tributary, the first tributary entering the Nordenskiold from the north-west approximately 1 km downstream of the Hutchi Lake outlet (Figure 1).

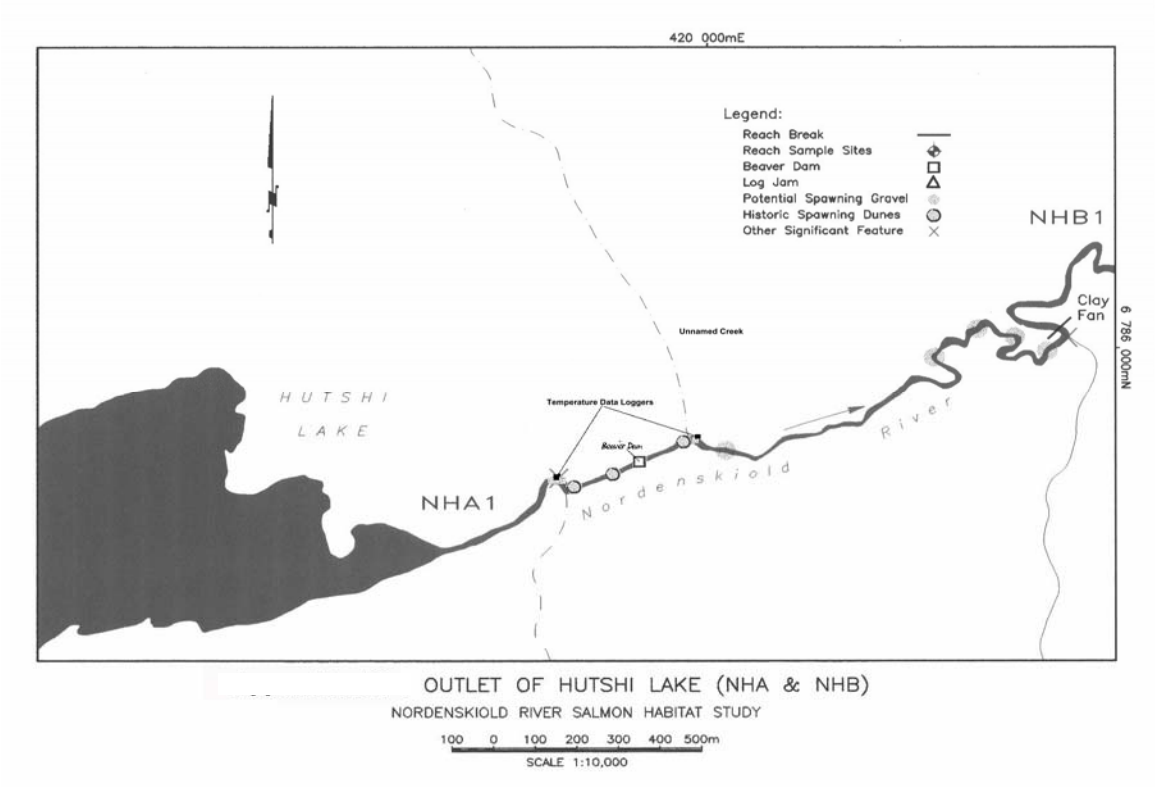


Figure 1: Nordenskiold River Juvenile Chinook Salmon Sampling Program 2003 Study Area

Objectives

Through active stewardship with a capacity building approach, CAFN's overall objective is to increase the numbers of returning salmon to the upper reaches of the Nordenskiold River drainage. CAFN also wishes to ensure that all cultural and renewable resources are protected for future generations.

Project Objectives:

Quantify usage of the upper Nordenskiold River system by JCS through intensive minnow trapping within the first 5 km of the Nordenskiold below Hutchi Lake and within the unnamed tributary;

Recover and replace temperature data loggers at the historic spawning site and at another site below the confluence with the unnamed tributary to collect ambient temperature data for salmon emergence timing projections and comparisons.

5 Methods

JCS Investigations

Investigations for the presence of juvenile Chinook salmon (jcs) on the Nordenskiold river and an unnamed tributary of the river near the outlet of Hutshi lake were conducted between August 2 and August 5, 2004.

A total of 48 gee-traps were set to capture juvenile Chinook salmon. Forty of these traps were set directly in the Nordenskiold and eight were set in the unnamed tributary, the first tributary entering the Nordenskiold from the north-west approximately 1 km downstream of the Hutchi Lake outlet. The traps were distributed over a wide range of juvenile Chinook salmon habitat.

A walnut-sized portion of previously frozen Yukon River origin salmon roe was used as an attractant . The Traps were placed in areas where there was adequate flow and cover and secured to the bank with a cord. Traps were retrieved after an approximate 20 hour soak.

Trapping was conducted in three locations within the study area (figure 1):

1. Unnamed tributary of the Nordenskiold River, located approximately 1.0 km downstream of Hutshi Lake.
2. Nordenskiold river downstream of the unnamed tributary
3. Nordenskiold River upstream of the unnamed tributary

All arctic grayling captured were weighed with an Acculab® pocket pro portable electronic scale to $1/10^{th}$ of a gram. All fish was measured for fork-length to the nearest millimeter(mm). Fork lengths, the distance from the most anterior part of the head to the median caudal fin rays (fork of tail), were taken for fork tailed fish such as salmonids and suckers. Total length, the distance from the most anterior part of the head to the tip of the longest caudal fin ray, were taken for fish without forked tails such as burbot and sculpins. For each trap, the date, location, habitat, numbers caught, and the number of hours set was recorded.

Temperature Data Logger

Two temperature data loggers were placed in the Nordenskiold River during the August 2003 investigation and were recovered during this study and replaced with two new loggers at the same locations. One logger was placed immediately upstream of a historic spawning dune on river left (8V- 419554E - 6785614N Nad27). The other temperature data logger was placed a few hundred metres downstream of the unnamed creek confluence on the Nordenskiold River (08V - 420364E - 6785801N - Nad 27 (see figure 1). The Habitat and Enhancement Branch of the Department of Fisheries and Oceans Canada, Whitehorse area office, supplied and pre-programmed the temperature data loggers. The data loggers were programmed to record temperature every hour.

6 *Results*

Gee-Trapping

A total of 8 fish consisting of three fish species were captured in the traps set between August 2 and August 5, 2004 at the three trapping locations. Of these none were juvenile Chinook salmon (JCS). The fish captured captured consisted of four arctic grayling (AG), two long-nose suckers (LNS) and one slimy sculpin (SS). All of the Arctic grayling were captured on the unnamed tributary.

Average fork-length for arctic grayling captured was 79.10 mm. Average weight was 5.69 grams and average condition Factor (K) was 1.14.

The following details fish captured at each respective site. Further details on each fish captured (i.e. length, weight, condition) are appended (Appendix 1).

Unnamed Tributary
Cross section reference site UTM (Nav 27): 420097.7E 6785821.8N

Number of Traps set: 8
Number/Species of fish caught: 4 AG, 1 SS

Water Temperature: 9.0^{o}C

Nordenskiold – Downstream of Unnamed Tributary
Cross section reference site UTM (Nav 27): 420041.8.7E 6785868.8N

Number of Traps set: 20
Number/Species of fish caught: 1 SS

Water Temperature: 12.0^{o}C

Nordenskiold – Up-stream of Unnamed Tributary
Cross section reference site UTM (Nav 27): 419568.1E 6785563.4N

Number of Traps set: 20
Number/Species of fish caught: 2 LNS

Water Temperature: 16.0^{o}C

Temperature Loggers

Temperature loggers were removed from the Nordenskiold River on August 4, 2004 having been in the river for approximately one year. The logger from the downstream location of the unnamed creek profiled a slightly lower temperature during the winter months, reaching –0.13^{o} C at times. The logger located upstream profiled slightly warmer winter temperatures falling only slightly below 1^{o}C at times (lowest temp = 0.78 ^{o}C). Summer temperatures were slightly higher at the upstream location where a maximum temperature of 25.07 ^{o}C was recorded in late June. At this time the downstream logger recorded a maximum temperature of 23.54 ^{o}C. Temperature profiles captured by the loggers are charted in appendix 4.

Discussion

The temperature logger located upstream of the unnamed creek indicated slightly higher winter and summer temperatures then the downstream logger. During field work conducted in August 2004 the water temperature in the unnamed creek was 9 ^{o}C whereas the Nordenskiold River upstream of the creek was 16 ^{o}C. Although not measured there is a relatively high volume of water flowing from the unnamed creek, enough volume to have a moderating affect on downstream temperatures on the Nordenskiold which were 12 ^{o}C at the time.

No juvenile Chinook salmon (JCS) were captured during this study. It is possible that no successful spawning event occurred in the area during 2003. During aerial reconnaissance surveys conducted during 2003 only one adult salmon was observed migrating up the Nordenskiold river near the lake outlet (vonFinster pers comm.). A number of adults were observed spawning upstream of Kirkland Creek but resulting offspring may have been swept out of the system due to high water conditions.

Arctic grayling were only captured in the unnamed tributary. One arctic grayling was captured upstream of a falls situated on the tributary. The falls located approximately 500 metres upstream of the confluence is 1.2 metres in height. It is likely that adult grayling and or juveniles are able to migrate upstream of the falls during flood conditions.

During a similar field program conducted in 2002 (Pumphreys, 2003) no JCS were captured in the Nordenskiold river. During the 2003 sampling JCS were captured in the Nordenskiold but in low numbers (3) and in only one (downstream of the tributary sampled) of two locations sampled. Thirty-six (36) JCS were captured in the tributary during 2002. During 2003 more JCS were captured in the tributary (96) however more traps were set (18 in 2003, 10 in 2002) during the 2003 sampling program.

7 References

Pumphrey, I., March, 1999. *Champagne & Aishihik First Nations' Salmon Restoration Development Plan for the upper Nordenskiold River: Salmon & Salmon Habitat Inventory*. Yukon River Panel

Pumphrey, I., March, 2001. *Champagne & Aishihik First Nations' Salmon Restoration Development Plan for the upper Nordenskiold River: Removal of Obstructions to Migration (1)*. Yukon River Panel

Pumphrey, I., March, 2002. *Champagne & Aishihik First Nations' Salmon Restoration Development Plan for the upper Nordenskiold River: Removal of Obstructions to Migration (2)*. Yukon River Panel

Pumphrey, I March 2003. Champagne & Aishihik First Nations' Upper Nordenskiold River Salmon Restoration 2002. Yukon River Panel RE-55-02

Petkovich 2004. Champagne & Aishihik First Nations' Upper Nordenskiold River Juvenile Chinook Salmon Investigations 2003

Von Finster, A. pers comm. 2005. Fisheries and Oceans Canada, Whitehorse, Yukon.

8 *Appendices*

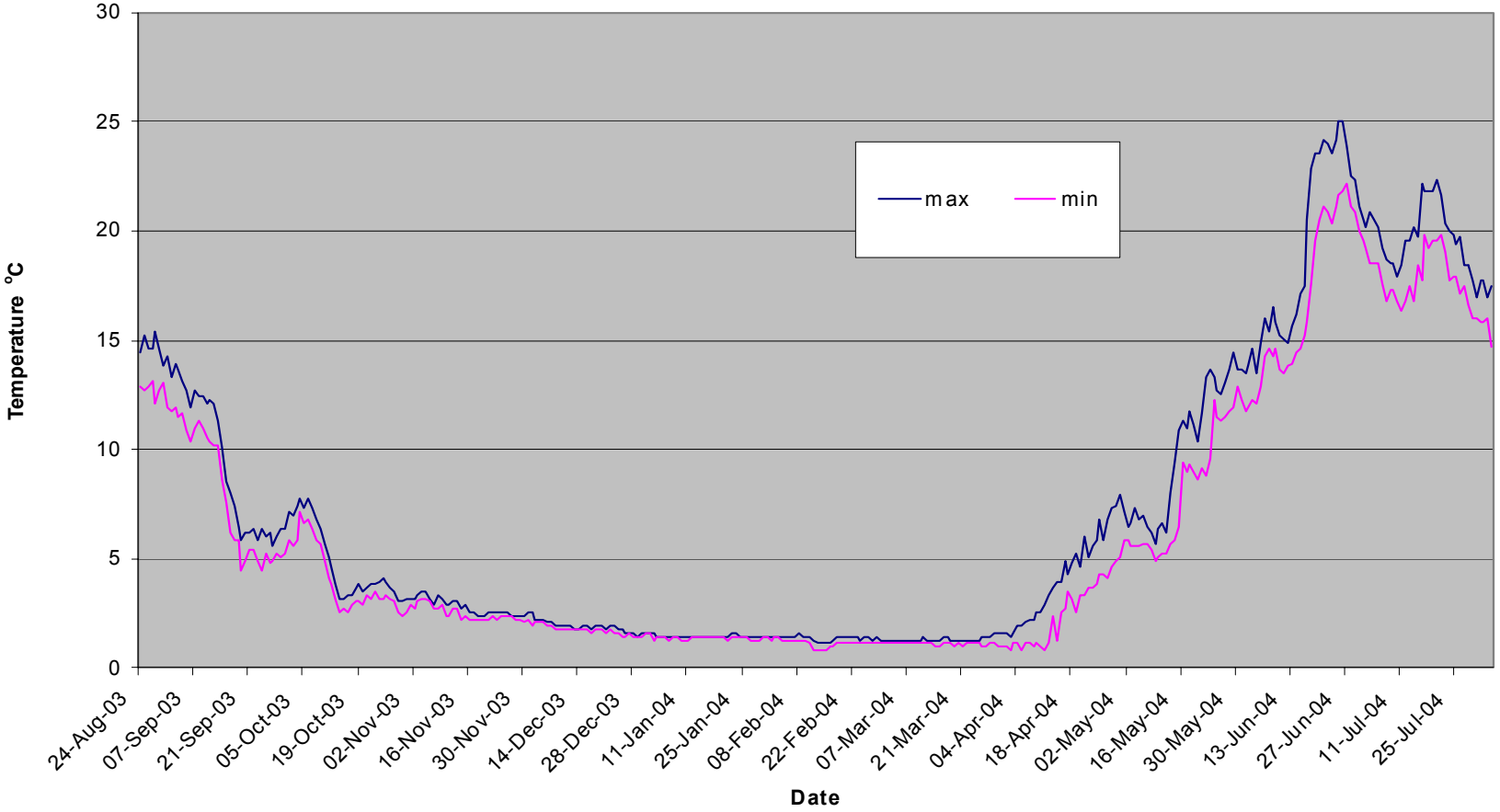
Appendix 1. Fish Captured/Sampled – Upper Nordenskiold River August 2-5, 2004

Trap #	Location	Fish #	Species	LENGTH (mm)	WEIGHT (g)		COMMENTS
1	U/S	1	LNS	48			
1	U/S	2	LNS	50			
21	D/S	3	SS	65			
31	UT	4	AG	83	4		
34	UT	5	SS	95			
34	UT	6	AG	78	4		
34	UT	7	AG	72	3.2		
37	UT	8	AG	71	3		above the falls

U/S - upstream of tributary
D/S - downstream of tributary
UT - unamed tributary

SS- Slimy Sculpin
AG – Arctic Grayling
LNS – Long-nose Suckers

Appendix 2: Nordenskiold River Temperature Profile Upstream of Unnamed Creek August 2003-August 2004



Appendix 3: Nordenskiold River Water Temperature Profile Downstream of Unnamed Creek August 2003 - August 2004